Original

U.S. Nuclear Regulatory Commission
License No. SMB-911
Amendment Application

Fansteel Inc.
Muskogee, Oklahoma

January 2000

Fansteel
Inc.
number ten tantalum place muskogee, oklahoma 74403-9297
(918) 687-6303 Fax (918) 687-6112

January 18, 2000

Dr. Carl Paperiello
Director, NMSS
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

License Amendment Application
TAC No. 40-7580
License No. SMB-911
Fansteel Inc.
Muskogee, Oklahoma

Dear Dr. Paperiello:

In accordance with Title 10, Code of Federal Regulations (CFR), Part 40, Fansteel Inc. (Fansteel) requests an amendment to their Nuclear Regulatory Commission (NCR) License No. SMB-911. This amendment will serve to clarify the product sampling and certification of product for sale to nonlicensed buyers. In addition, Part I of the license has been revised. Two copies of the original License Amendment Application are enclosed. The original has been sent to the Public Document Room and a copy to the Project Manager, Ms. Heather Astwood.

This amendment is requesting the following change:

License Condition 24 - Change to read: "The licensee shall certify to all non-licensed recipients that each shipment contains less than 0.05 percent uranium/thorium combined."

This limit is in agreement with the definition of source material found in 10 CFR 40.4 and in Section 40.13 Unimportant quantities of source material.

Changes to NRC Form 313, Page 2 of 3 include:

- Item 5c – *Maximum Amount Processed* – Change to read:

  Maximum amount possessed

- Item 5c(1) and (2) – *Uranium 238* and *Thorium 232* – Change to read:

  Natural Uranium and Natural Thorium
  To be consistent with the license.

- *Item 7 – Individual Responsible for Radiation Safety Program* – Change to read:

  Individual(s) Responsible for Radiation Safety Program

Changes to Part I of the license include:

- Addition of Plant Operations Managers' education, training, and experience requirements (replacing Section 2.1.1.4, Page 2.2).
- Expansion of the As Low As Reasonably Achievable (ALARA) policy to be implemented through the use of area and perimeter monitoring, and personal exposure monitoring (replacing Section 2.2, Page 2-4).
- Clarification of the site-specific derived air concentration (DAC) value and related administrative and action levels in response to Item No. 3.2 b (2) on Page 19 of the July 7, 1999 Inspection Report 40-7580/99-01 (replacing Section 3.5.1, Page 3-3).
- Incorporation of response to NRC Comment No. 16 from the response letter dated February 3, 1999 regarding liquid effluent sampling (replacing Section 3.5.5, Page 3-4).
- Move reporting requirements regarding groundwater radioactivity measurements to Section 3.5.5, Liquid Effluent (replacing Section 3.5.6, Page 3-5). No groundwater leaves the site except through National Pollutant Discharge Elimination System-permitted Outfall 001.
- Addition of the liquid effluent actions to be taken in case of exceedence (replacing Section 3.5.5, Page 3-5).

Enclosed are two copies of a revised License Amendment Application including NRC Form 313, the current License No. SMB-911 and modifications, and Part I of the General License Information. The originals have been sent to the Public Document Room. These changes affect the license amendment dated September 2, 1999. All changes made have been marked with a bar in the right margin.

Your assistance in reviewing this License Amendment Application on an expedited basis is needed. If you have any questions that require clarification, please feel free to contact the facility at any time.

Sincerely,

Michael J. Mocniak/eg

Michael J. Mocniak
Vice President

MJM:bd

Enclosures

cc: Original to Public Documents Room
Ms. Heather Astwood, Project Manager

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Original

U.S. Nuclear Regulatory Commission
License No. SMB-911
Amendment Application

Fansteel Inc.
Muskogee, Oklahoma

Project No. 3789ZF
January 2000

Earth Sciences Consultants, Inc.
One Triangle Lane
Export, PA 15632
724/733-3000
FAX: 724/325-3352

Branch Offices
Akron, Ohio
Philadelphia, Pennsylvania

NRC Form 313

NRC FORM 313 U. S. NUCLEAR REGULATORY COMMISSION

(5-1997)
10 CFR 30, 32, 33
34, 35, 36, 39 and 40

APPROVED BY OMB: NO. 3150-0120 EXPIRES: 7/31/1999

Estimated burden per response to comply with this information collection request: 7 hours. Submittal of the application is necessary to determine that the applicant is qualified and that adequate procedures exist to protect the public health and safety. Forward comments regarding burden estimate to the Information and Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0120), Office of Management and Budget, Washington, DC 20503. NRC may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a currently valid OMB control number.

APPLICATION FOR MATERIAL LICENSE

INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW.

APPLICATION FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:

DIVISION OF INDUSTRIAL AND MEDICAL NUCLEAR SAFETY
OFFICE OF NUCLEAR MATERIALS SAFETY AND SAFEGUARDS
U.S. NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20555-0001

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS:

IF YOU ARE LOCATED IN:

CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, PENNSYLVANIA, RHODE ISLAND, OR VERMONT, SEND APPLICATIONS TO:

LICENSING ASSISTANT SECTION
NUCLEAR MATERIALS SAFETY BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406-1415

ALABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA, PUERTO RICO, SOUTH CAROLINA, TENNESSEE, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO:

ATLANTA FEDERAL CENTER
U. S. NUCLEAR REGULATORY COMMISSION, REGION II
61 FORSYTH STREET, S.W., SUITE 23T85
ATLANTA, GEORGIA 30303-3415

IF YOU ARE LOCATED IN:

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO:

MATERIALS LICENSING SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION III
801 WARRENVILLE RD.
LISLE, IL 60532-4351

ALASKA, ARIZONA, ARKANSAS, CALIFORNIA, COLORADO, HAWAII, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEVADA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, OREGON, PACIFIC TRUST TERRITORIES, SOUTH DAKOTA, TEXAS, UTAH, WASHINGTON, OR WYOMING, SEND APPLICATIONS TO:

NUCLEAR MATERIALS LICENSING SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TX 76011-8064

PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S.NUCLEAR REGULATORY COMMISSION JURISDICTIONS.

1. THIS IS AN APPLICATION FOR *(Check appropriate item)*
   - [ ] A. NEW LICENSE
   - [X] B. AMENDMENT TO LICENSE NUMBER SMB-911
   - [ ] C. RENEWAL OF LICENSE NUMBER _____

2. NAME AND MAILING ADDRESS OF APPLICANT *(Include Zip code)*
   Fansteel Inc.
   Number One Tantalum Place
   North Chicago, IL 60064

3. ADDRESS(ES) WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED
   Fansteel Inc.
   Number One Tantalum Place
   Muskogee, OK 74403

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION
   Monty Mooring
   TELEPHONE NUMBER
   (918) 687-6303

SUBMIT ITEMS 5 THROUGH 11 ON 8-1/2 X 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.

5. RADIOACTIVE MATERIAL.
   a. Element and mass number; b. chemical and/or physical form; and c. maximum amount which will be possessed at any one time.

6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED.

7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING EXPERIENCE.

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.

9. FACILITIES AND EQUIPMENT.

10. RADIATION SAFETY PROGRAM.

11. WASTE MANAGEMENT.

12. LICENSEE FEES *(See 10 CFR 170 and Section 170.31)*
    FEE CATEGORY | AMOUNT ENCLOSED $

13. CERTIFICATION. *(Must be completed by applicant)* THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT.

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35, 36, 39 AND 40, AND THAT ALL INFORMATION CONTAINED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF.

WARNING: 18 U.S.C. SECTION 1001 ACT OFJUNE 25, 1948 62 STAT. 749 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

CERTIFYING OFFICER – TYPED/PRINTED NAME AND TITLE	SIGNATURE	DATE
Michael J. Mocniak, Vice President	M J Mocniak	1-18-00

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	AMOUNT RECEIVED $	CHECK NUMBER	COMMENTS
APPROVED BY				DATE	

License SMB-911 Amendment Request
Information Requested to be Attached to Form 313

Item 5 - Radioactive Material

a. Element and mass number

Uranium U-238
Thorium Th-232

b. Chemical/physical form

(1) Solid form as an oxide in tin slag and ore processing residues.
(2) As a contaminant in soil and sediment.

c. Maximum amount possessed

(1) Natural Uranium - 43,000 kg (2) Natural Uranium - 4,000 kg
Natural Thorium - 71,000 kg Natural Thorium - 2,500 kg

This proposed amendment is for the processing of licensed material currently stored on site.

Item 6 - Purposes for Which Licensed Material will be Used

Authorization is requested for the possession, use, storage, and transfer of natural uranium and thorium and their progenies, contained in metal processing residues. The material will not be used, per se, as it is viewed as a contaminant to the process.

Item 7 – Individual(s) Responsible for Radiation Safety Program

Plant Radiation and Safety Officer - Currently Monty Mooring
B.S. Chemistry, Northeastern State University of Oklahoma, 1991
10 years of industrial experience
Certified as successfully completing the PRSO course offered by CSI (Communications Science Institute), Gaithersburg, MD, June 1999

Item 8 - Training for Individuals Working in a Restricted Area

Training for individuals working in the plant is administered at orientation and annually as refresher training. In addition, specific training is held as new or different procedures are introduced.

Item 9 - Facilities and Equipment

The facility and equipment is located at the following:

Fansteel Inc.
10 Tantalum Place
Muskogee, OK 74403-9296

The facility will contain all equipment necessary to extract Tantalum, Columbium, and Scandium from pond residues. In addition, it contains equipment necessary to meet plant specific and National Pollutant Discharge Elimination System (NPDES) requirements for plant effluents.

Item 10 - Radiation Safety Program

Items are addressed in Section 3.0 of Part I of the license

Item 11 - Waste Management

Liquid waste will be treated and discharged per NPDES permit. Solid wastes will be treated, minimized, processed, stored, and disposed of per operating plan.

Item 12 - License Fees

The license currently falls under 10 Code of Federal Regulations 170.31 Category 2, License Amendment, and is stated as "Full Cost". Therefore, the license fee is billable by the Nuclear Regulatory Commission.

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Current License SMB-911
and Modifications

NRC FORM 374 U.S. NUCLEAR REGULATORY COMMISSION

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Fansteel, Inc. SMB-911	3. License Number SMB-911 Amendment 7
2. Number One Tantalum Place North Chicago, Illinois 60064	4. Expiration Date September 30, 2002
	5. Docket No. 40-7580 Reference No.

6.	Byproduct Source, and/or Special Nuclear Material	7. Chemical and/or Physical Form	8. Maximum amount that Licensee May Possess at Any One Time Under This License
A.	Natural Uranium	A. Tin slags, ores, concentrates, process residues, and uranium oxides	A. 43,000 kg uranium
B.	Natural Thorium	B. Tin slags, ores, concentrates, process residues, and thorium hydroxide	B. 71,000 kg thorium
C.	Natural Uranium	C. As a contaminant in soil and sediment	C. 4,000 kg uranium
D.	Natural Thorium	D. As a contaminant in soil and sediment	D. 2,500 kg thorium

9. Authorized place of use: The licensee's existing facilities at Muskogee, Oklahoma. The portion of the Fansteel Property identified as the Northwest Property in Figure 2, Dwg. No. 0111210, of the licensee's Additional Radiation Survey Activities Report dated December 1995, and as defined by the legal description provided thereon, is released from the restrictions of this license. This release is based on the statements and representations made in the application dated July 8, 1993, and supplements dated December 28, 1993; May 24, July 27, and December 1, 1994; December 18, 1995; and March 16, 1996.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number
SMB-911

Docket or Reference Number
40-7580

Amendment No. 7

10. Authorized use: For use in accordance with statements, representations, and conditions contained in Part I (Chapters 1 through 5) of the application submitted by letter dated May 10, 1999, and supplemented by letters dated February 3, May 17, and July 7, 1999.

11. Deleted by Amendment 4, dated March 1999.

12. The licensee shall have a qualified Plant Radiation Safety Officer (PRSO) on site for all licensed activities.

13. Deleted by Amendment 2, dated February 1999.

14. The minutes of the Radiation Safety Committee meeting shall be submitted, as a minimum, to the Committee members.

15. Deleted by Amendment 2, dated February 1999.

16. Deleted by Amendment 5, dated May 1999.

17. Deleted by Amendment 2, dated February 1999.

18. Deleted by Amendment 4, dated March 1999.

19. Deleted by Amendment 4, dated March 1999.

20. Deleted by Amendment 6, dated August 1999.

21. The licensee shall review the decommissioning cost estimate by April 1998 and thereafter at intervals not to exceed 13 months. The estimate shall be adjusted to reflect the current appraisal of waste volumes, costs, and disposal methods. Financial instruments to assure the cost estimate shall also be updated to reflect changes in this amount, if the amount increases by more than 1 percent.

22. Deleted by Amendment 6, dated August 1999.

23. Deleted by Amendment 2, dated February 1999.

24. The licensee shall notify all recipients of solid products/waste of the concentration of radionuclides in each batch transferred.

25. All source material stored outside of the process buildings at the Fansteel facility (other than material contained in the ponds) shall be placed on raised pallets on a concrete pad. The area shall be sheltered by a roof and shall be surrounded by a concrete berm for containment.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number
SMB-911

Docket or Reference Number
40-7580

Amendment No. 7

26. Remediation and decommissioning activities at the Muskogee facility shall be performed in accordance with the decommissioning plan and supplemental correspondence submitted by letter dated June 16, 1999 and supplemented by letter dated July 16, 1999.

27. The licensee shall use the following criteria for release for unrestricted use:

Groundwater activity:

30 pCi/L of uranium (U-238, U-235, and U-234) and
15 pCi/L adjusted gross alpha (gross alpha excluding radium-226 and uranium);

Soil activity:

10 pCi/g from any combination of natural uranium and thorium;

Exposure rate from soil:

10 micro-roentgen (μR) per hour (hr) above background at one meter (m) from the surface averaged over a 100 m^2 grid, where the maximum may not exceed 20 μR/hr;

Activity on equipment and structure surfaces:

Surfaces are to be cleaned to the release limits for natural thorium:

1,000 dpm per 100 cm^2 alpha radioactivity, total;
200 dpm per 100 cm^2 alpha radioactivity, removable;
3,000 dpm per 100 cm^2 alpha radioactivity, maximum over 100 cm^2;
5,000 dpm per 100 cm^2 beta-gamma radioactivity, total;
1,000 dpm per 100 cm^2 beta-gamma radioactivity, removable; and
15,000 dpm per 100 cm^2 beta-gamma radioactivity, maximum over 100 cm^2;

For surfaces contaminated with natural uranium and thorium that cannot be cleaned to the thorium release limit, the sum of uranium and thorium activity fractions may not exceed 1 (as defined by the unity rule in Section 4.2 of the Decommissioning Plan submitted by letter dated June 16, 1999), where uranium activity values are as follows:

5,000 dpm per 100 cm^2 alpha radioactivity, total;
1,000 dpm per 100 cm^2 alpha radioactivity, removable;
15,000 dpm per 100 cm^2 alpha radioactivity, maximum over 100 cm^2;
5,000 dpm per 100 cm^2 beta-gamma radioactivity, total;
1,000 dpm per 100 cm^2 beta-gamma radioactivity, removable; and
15,000 dpm per 100 cm^2 beta-gamma radioactivity, maximum over 100 cm^2;

MATERIALS LICENSE
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License Number
SMB-911

Docket or Reference Number
40-7580

Amendment No. 7

Exposure rate from building surfaces:

5 μR/hr above background at 1 m from the surface averaged over area not to exceed 10 m^2

28. The licensee shall conduct a final survey and sampling program to ensure that residual contamination meets the unrestricted use criteria in this license. Buildings, equipment, and outdoor areas shall be surveyed in accordance with NUREG/CR-5849, "Manual for Conducting Radiological Surveys in Support of License Termination."

a.) Soil and soil-like materials with elevated activities exceeding the unrestricted use criteria shall be investigated to determine compliance with the averaging criteria of NUREG/CR-5849. These criteria address averaging concentrations over any 100 m^2 (A) and use the $(100/A)^{½}$ elevated area method.

b.) Radioactivity levels shall not exceed the averaging criteria in NUREG/CR-5849. Radioactively contaminated material that exceeds the averaging criteria defined in NUREG/CR-5849 shall be removed and transferred to a licensed, low-level radioactive waste disposal facility.

FOR THE NUCLEAR REGULATORY COMMISSION

Date: September 2, 1999

By: Theodore S. Sherr, Chief
Division of Fuel Cycle Safety
and Safeguards
Washington, DC 20555

Proposed License Modifications

License No. SMB-911

24. The licensee shall certify to all non-licensed recipients that each shipment contains less than 0.05 percent uranium/thorium combined.

General License Information

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General License Information
License Amendment Request
License No. SMB-911

1.0 Standard Conditions and Special Authorizations

1.1 Name, Address, and Corporate Information

Corporate Office of Licensee

Fansteel Inc.
Number One Tantalum Place
North Chicago, IL 60064

Plant Facilities of Licensee

Fansteel Inc.
Number Ten Tantalum Place
Muskogee, OK 74403

Fansteel Inc. (Fansteel) is incorporated under the laws of the State of Delaware. Its corporate office is situated at Number One Tantalum Place, North Chicago, Illinois 60064.

1.2 Site Location(s)

The plant facilities are situated in Muskogee County, Oklahoma approximately 2-1/2 miles northeast of the City of Muskogee. The Eastern Property area of the plant contains approximately 110 acres of land. License No. SMB-911 covers this area of the facility. The remaining 35 acres of the facility known as the Northwest Property has been released from the current license as shown in current License Condition 9. The plant site is bounded on the north by land owned by Muskogee Port Authority and used for industrial purposes, on the east by the Arkansas River, on the south by U.S. Highway 62, and on the west by State Highway 165 and an appurtenant service road. The site location is shown in Figure 1.

The plant facilities include 11 structures, 7 of which are metal constructions, the remainder being masonry or brick construction. The plant facilities include storage pads of poured concrete construction, railroad spur tracks, service roads, electrical power substations, processing treatment and storage ponds, and basins. A map of the plant facilities is shown in Figure 2.

1.3 License Number and Period of License

The license number is SMB-911. This license amendment is requested for the duration of the current renewal period through September 30, 2002.

1.4 Possession Limits

The maximum quantity of source material to be possessed and used on site in work-in-process (WIP) and processing residue form is 43,000 kilograms of uranium (U) and 71,000 kilograms of thorium (Th). The maximum quantity of source material to be possessed and used on site as a contaminant in soils and sediment is 4,000 kilograms of U and 2,500 kilograms of Th.

1.5 Authorized Activities

Authorization is requested for the possession, use, short-term storage, and transfer of U and Th and their progenies contained in processing residues. The activities included herein are residue processing, metal reclamation, decontamination, remediation, decommissioning, and site restoration.

2.0 General Organizational and Administrative Requirements

2.1 Organizational Responsibilities and Authority

In order to provide an effective radiation management program, Fansteel has identified several key positions of responsibility and has established a Radiation Safety Committee (RSC). A description of key personnel and their responsibilities as well as a description of the RSC is presented below.

2.1.1 Key Personnel

The Plant Radiation Safety Officer (PRSO), Site General Manager (SGM), Plant Safety Director (PSD), Plant Operations Managers for Process and Utilities/Mining (POM), and Crew Leaders have been designated as key personnel. Figure 3 shows the RSC organizational structure. Education and experience requirements as well as the position responsibilities for the PRSO, SGM, PSD, POM, and Crew Leaders are included in the following paragraphs.

2.1.1.1 Plant Radiation Safety Officer

The PRSO is responsible for monitoring operations for license and regulatory compliance, educating personnel, record keeping, and advising the operating groups regarding safe handling of radioactive materials. The PRSO is the person specifically listed by the Nuclear Regulatory Commission (NRC) as the responsible party for compliance with the laws and regulations affecting the manufacture and use of radioactive materials at Fansteel. The PRSO is also responsible for implementation of modifications to the Radiation Safety Manual (RSM).

The educational, training, and experience requirements for the PRSO are as follows:

- Bachelor's degree in physical sciences or the equivalent.
- Adaptive training and/or experience in radiation safety or health physics may be substituted for or used in conjunction with the educational requirements.

2.1.1.2 Site General Manager

The SGM has overall responsibility for plant operations. As chairperson of the RSC, the SGM is charged with supporting the PRSO in the effective execution of his duties.

2.1.1.3 Plant Safety Director

The PSD has overall responsibility for general plant safety issues.

The educational, training, and experience requirements for the PSD are as follows:

- Bachelor's degree in biological, health, or physical sciences or the equivalent.
- Five years' industrial work experience within or relating to chemical plant operations.
- Experience with and/or training in proper use of applicable safety equipment.
- Trained in industrial first aid.

This individual will also be a member of the RSC.

2.1.1.4 Plant Operations Managers

The POM is responsible for chemical safety as it applies to plant operations and is responsible for the implementation of standard operating procedures (SOP). This individual is also a member of the RSC.

The education, training, and experience requirements for the POM are as follows:

- Bachelor's degree in engineering or the physical sciences or related experience;
- At least 5 years industrial work experience within or relating to chemical plant operations; and
- Experience with and/or training in proper use of applicable safety equipment.

2.1.1.5 Crew Leaders

Responsibilities of the Crew Leaders for the conduct of the radiation safety program include the following:

- Be thoroughly familiar with all requirements for safe handling of radioactive materials.
- Provide proper on-the-job training.
- Enforce all specific processing procedures and requirements for safe handling of radioactive materials.
- Take prompt corrective action when notified by the PRSO of the need for such action.

The educational, training, and experience requirements for the Crew Leaders are as follows:

- GED high school equivalent and a minimum of the following:
  - Eight hours of radiation safety training
  - Four hours of plant safety training

2.1.2 Radiation Safety Committee

An RSC has been established at the Fansteel Muskogee Plant. It is comprised of the SGM, the PRSO, PSD, POM, and the Crew Leaders on each shift. The committee is chaired by the SGM and is responsible for establishing policies for continued improvement in processing operations. The goal of the committee is to ensure that employee radiation exposures and effluent releases are "As Low As Reasonably Achievable" (ALARA), and that the requirements of the NRC Source Materials License for the plant are being satisfied. The organization of the committee is shown in Figure 3.

The committee will meet quarterly or more frequently if deemed necessary by the RSC. Meeting minutes are maintained by the PRSO and action items are identified and tracked to ensure closure. The minutes of the RSC meetings shall be submitted to the committee members. Copies of meeting minutes are available to all employees from the PRSO upon request. Decisions of the Committee are implemented by the PRSO, the PSD, or the POM as appropriate. It is the PRSO's responsibility to incorporate procedural changes in the RSM. It is the responsibility of the POM to incorporate procedural changes in the plant SOPs. It is the responsibility of the Laboratory Manager to incorporate procedural changes in the sampling and analysis SOPs. Revisions to the RSM and SOPs shall be evaluated and approved by the RSC prior to implementation. The following members of the RSC will review and approve each proposed modification:

- SGM
- PRSO
- PSD
- POM (Process and Utilities/Mining)

Approved procedures must be signed by the RSC members prior to distribution and use. Records of approved changes are maintained for review by the PSD. Operating procedures should be reviewed at least annually.

The RSC will use trend analysis to monitor surface contamination, radiation measurement instrument operation, and respiratory protection equipment and effluent filtration systems operation. Also, the RSC shall review and evaluate, at least every 12 months, data from the previous 18 months regarding the following:

- Internal and external exposures
- Unusual occurrences
- Airborne radioactivity levels

- Radiological effluent releases
- Chemical effluent releases
- Environmental monitoring
- National Pollutant Discharge Elimination System (NPDES) compliance
- NRC compliance inspection violations and those actions that must be taken to maintain compliance and to respond to corrective action requirements

Review of these data will focus on the following:

- Upward trends in exposures or concentrations
- ALARA-based methods for lowering exposures or concentrations
- Use, maintenance, and inspection of effluent and exposure control equipment

2.2 ALARA Policy

Fansteel is committed to maintaining radiation exposures and releases of radioactive materials in effluents to unrestricted areas ALARA. The term "as low as reasonably achievable" takes into account the state of technology and the economics of improvements in relation to benefits to the public health and safety and other societal and socio-economic considerations.

This policy will be implemented by means of the following:

- The plant Radiation Safety Program.
- Monitoring of plant effluent and plant area groundwater for possible radioactive materials content.
- Area and perimeter air monitoring.
- Personal exposure monitoring.
- Continued review of current activities to assure that release of radioactive material is always maintained ALARA. This includes but is not limited to the following procedures:
  - Increase monitoring
  - Control access
  - Limit exposure times
  - Use respiratory equipment

To support the goal of ALARA, the PRSO will review the occupational exposure history of all site personnel quarterly to ensure records of internal and external exposures are being maintained. The PRSO will report these results to the RSC for trend analysis.

2.3 Training

Training individuals working at the Fansteel facility is of utmost importance. Plant personnel will receive annual training commensurate with their level of responsibility. Training helps Fansteel's personnel as well as outside contractor personnel comply with facility radiation safety procedures. Each employee will receive a copy of the Employee Handbook regarding radiation protection.

2.4 Procedures

The Fansteel plant operates under a set of SOPs that help facilitate protection from radiological and chemical hazards at the facility. Plant written procedures shall be reviewed, revised, and approved by the RSC, then implemented in the plant. Modifications are made to the RSM and SOPs to reflect process changes and observed safety issues.

2.5 Audits and Inspections

An audit of the Radiation Safety Program and an inspection of operations are made annually, or more frequently if needed, by the PRSO, PSD, and POM to determine if operations are being conducted in accordance with written procedures and satisfy applicable regulations, license conditions, and Fansteel policies. The findings of the audit, including deficiencies and the corrective actions taken, shall be documented in a formal report to the RSC.

2.6 Investigations and Reporting

The plant RSO shall be responsible for investigating incidents and analyzing situations that could result in an NRC reportable incident. Incidents that are reportable in accordance with NRC regulations as outlined in Regulatory Guide 10.1 shall be reported by the Site General Manager or his designee.

2.7 Records

Records required by regulations will be maintained as specified in the regulations or for 2 years when unspecified. The plant maintains a system of records pertaining to the conduct of its Radiation Safety Program including unusual operational incidents and events associated with radioactive releases, audits and inspections, instrument calibration, employee training, and environmental surveys. These records will be regularly maintained for at least 2 years.

3.0 Radiation Protection

Radiological procedures have been developed for the safe handling and processing of residues containing source materials which are stored at the Fansteel Muskogee Plant. The source materials contained in these residues are U and Th and their radioactive decay products. The following paragraphs in this section describe protective procedures in effect at the Fansteel site.

3.1 Radiation Safety Training

New employees who are assigned to work areas that exhibit airborne radioactivity or areas in which radioactive materials are processed will receive radiation safety training upon employment. In addition, outside contractors performing work in these areas will also receive training. All employees and selected contractors will receive a copy of the Employee Handbook at the initial training and will receive refresher training covering the same material on an annual basis. The Muskogee City Fire Department is invited annually for a familiarization tour of the facility where a radiation safety briefing is also given along with a tour of the current buildings and grounds. In addition, employees are specifically trained on 10 Code of Federal Regulations (CFR) 20.1208, exposure to embryo or fetus notification requirements.

3.2 Special Work Permit System

Fansteel will develop and use, if necessary, a Special Work Permit system for areas of the plant where one or more of the following may apply:

- Areas that exhibit levels of airborne radiation in excess of action guidelines established by Fansteel in this document.
- Areas requiring special shielding or ventilation.
- Areas with monitoring requirements above and beyond those identified in this RSM.
- Areas requiring Personnel Protective Equipment above Level D (respirator) due to radiological concentrations.
- Areas requiring special work limitations or instructions.

3.3 Occupational Exposure Control

Personal exposure to radioactive material is measured by means of thermoluminescent dosimeters (TLD). These TLDs will be worn whenever workers are engaged in activities where radioactive material is present.

3.4 General Safety Procedures

General safety rules are taught to plant staff during routine training. Fansteel has defined rules regarding safe radioactive material handling for staff implementation. These rules include, but are not limited to, the following:

- Respiratory protection will be available for use in the event of a plant emergency.
- Personnel working in plant processing areas wear uniforms, hardhats, safety glasses, and gloves.
- Terminate and isolate spills immediately when safe to do so.
- Smoke alarms are placed throughout the process areas.
- Safety equipment is maintained and tested in accordance with the manufacturers' recommendations and SOP.
- Management safety reviews will be conducted formally on a semiannual basis or as often as required to update personnel.
- A dedicated fire detection and suppression system will be installed in the solvent extraction area.
- Fansteel personnel will meet with the Muskogee City Fire Department on an annual basis to discuss potential fire hazards and prevention at the facility.
- An agreement with the Muskogee City Fire Department will be maintained that in case of a fire, the fire department will come to the aid of Fansteel.
- Work force personnel will be trained in fire prevention and safety when hired and in annual refresher courses.

3.5 Radiological Material Management Program

The Radiological Material Management Program is the responsibility of the PRSO. The program includes the management of airborne, surface, and personnel contamination, radon monitoring, and both liquid and air effluent management, groundwater monitoring, process emission monitoring, and raw material and product sampling.

3.5.1 Plant Area and Personnel Exposure Airborne Contamination Management

Inhalation or ingestion of airborne radioactive particles is the primary means of contamination at this facility. For each processing area, air sampling will occur continuously for the first 3 weeks of processing. Once a baseline has been established, representative air samples will be taken weekly in areas identified by the PRSO that have a significant potential for airborne contamination. Air sampling will be done in accordance with NRC Regulatory Guide 8.25, "Air Sampling in the Work Place".

After validation of the baseline sampling program, personal air samplers will be worn by at least 10 percent of the individuals assigned to those areas that the PRSO has identified to have a significant potential for airborne contamination in the breathing zone, but in no case less than one individual per area.

For those areas where airborne activity is expected, Fansteel will use the Th-232 DAC value identified in 10 CFR 20, Appendix B, Table 1, Column 3, i.e., 1×10^{-12} microcuries per milliliter (μCi/ml) as a site-specific DAC, the maximum activity limit for all air particles. Fansteel will use 50 percent of the Th-232 DAC value as an administrative limit, i.e., 5×10^{-13} μCi/ml, and 75 percent of the Th-232 DAC value as an action limit, i.e., 7.5×10^{-13} μCi/ml. If exceeded, the PRSO will identify the source and implement suitable corrective measures. These may include, as needed, recounting personal air samples, comparison of personal air sample data with fixed-area air sample data from the same time period and location within the plant, immediate notification of the Plant Manager and Area Supervisor, shut down of suspected equipment, inspection of equipment, and isolation or control corrections to eliminate the source.

Th-232 will be used to set the Minimum Detectable Activity, which will be less than half the administrative level set at 5×10^{-13} μCi/ml. Air sampler and detection instrument calibration will be performed annually.

The ventilation system for the source material product packaging area is sufficient to develop a negative pressure environment in this area. As appropriate, air filtration controls will be used with a maximum differential pressure to provide optimum ventilation system performance. Exhaust monitoring will be conducted during the service life of the first filter to measure ventilation system performance. Air monitoring will be conducted within the packaging area to determine the airborne activity during packaging activities, for exposure monitoring, and for trend analysis. Fansteel will verify that the airflow pattern will be from areas of low potential contamination to areas of greater potential contamination using smoke, wind ribbons, or other visual means.

The specific design and operating parameters of the proposed ventilation system were provided to and received by the NRC prior to commencement of reprocessing activities.

3.5.2 Surface Contamination Management

The program for controlling surface contamination in areas of the plant where source material is present consists of utilizing good housekeeping procedures coupled with contamination surveys while processing. Biweekly surface contamination surveys and wipe samples will be taken by the PRSO or his designated representative to look for alpha activity. Surface contamination surveys of equipment used in processing areas will be required prior to release from these areas.

Housekeeping practices are to be implemented on a daily basis in these areas to ensure that surface contamination is minimized. In the event of any spill in excess of normal end-of-shift cleanup or any spill that requires stoppage of normal activities or duties, the spill must be cleaned to within acceptable limits.

3.5.3 Personnel Contamination Management

The radiation safety procedures are designed to ensure that personnel contamination is minimized. Employees who work in the processing area of the plant are issued uniforms on a weekly basis. The used uniforms are surveyed for alpha contamination prior to pick up by a laundry service. This ensures that contamination levels are below the action levels prior to release to the laundry service.

3.5.4 Radon Monitoring

A potential exists for elevated radon concentrations in areas where source material is processed and stored. The plant ventilation system is designed to control radon at levels below acceptable limits. Radon sampling is conducted on a quarterly basis in areas identified by the PRSO.

3.5.5 Liquid Effluent

Any liquid effluents resulting from process operations will be discharged through NPDES-permitted Outfall 001. The liquid effluent discharged from the plant at Outfall 001 is monitored using a continuous sampler. One composite sample is collected every 24 hours when the outfall is discharging. This composite sample is made up of grab samples taken throughout the 24-hour discharge period based on daily flow volume. Three of the composite samples taken each week when the outfall is discharging are then analyzed for gross alpha and gross beta activity. Chemical parameters monitored are outlined in the current NPDES Permit No. OK0001643 for effluent. No radioactive materials will be discharged to the sanitary sewer system.

The following actions are taken in sequence, depending on the results of the radiological analyses of samples from Outfall 001:

1. If action levels of 15 and 50 picocuries per liter for gross alpha and gross beta respectively are exceeded, the sample will then be analyzed for specific U isotopes (U-234 and U-238) and specific Th isotopes (Th-228 and Th-232).

2. If the concentration of any radionuclide in the effluent sample exceeds 25 percent of the unrestricted isotopic concentration of a licensed material as listed in 10 CFR Part 20, Appendix B, Table 2, an investigation will be made to determine the possible cause and appropriate corrective action will be taken.

3. If the value in 10 CFR 20, Appendix B, Table 2 is exceeded by more than ten times, Fansteel will submit a report to the Administrator, NRC Region IV and the OKDEQ within 30 days of verification of exceedance.

For initial radioactivity analysis, the U.S. Environmental Protection Agency Method 900 "Gross Alpha and Gross Beta Radioactivity in Drinking Water" or an equivalent procedure will be used. The lower limits of analysis are specified in this methodology.

3.5.6 Groundwater Monitoring

Several groundwater monitoring points are located around the Fansteel site. These monitoring locations are managed in accordance with the current NPDES Permit No. OK0001643 and its subsequent modifications. A copy of the revisions to the NPDES permit will be provided to the NRC when and if it is amended in the future. In addition to parameters listed in the current NPDES permit, the groundwater samples taken from the required locations will be analyzed for gross alpha and gross beta activity solely for monitoring purposes. Groundwater only leaves the site through NPDES-permitted Outfall 001 after treatment.

3.5.7 Perimeter Monitoring for Airborne Plant Reprocessing Emissions

Radioactive process emissions from this facility are those associated with scrubber emissions from the dryers, calciner, and tank vents. Release rates of U and Th will be monitored by measuring alpha activity in particulate samples collected at the fence-line perimeter of the processing area. Stack sampling will be performed on a quarterly basis, when operating, as a secondary method to provide a baseline indication of the performance of the processing plant.

Fansteel will conduct fence-line perimeter monitoring to detect gross alpha particle activity at 50 percent of the activity-based calculated effluent concentration limit of 5.7×10^{-14} µCi/ml. This value, 2.85×10^{-14} µCi/ml, will serve as the administrative limit. The calculated effluent concentration limit is based on an average of the alpha activity of the four primary constituents of concern--U-234, U-238, Th-228, and Th-232. Sampling locations will be established at the northeastern, southeastern, southwestern, and northwestern corners of the reprocessing area along the perimeter fence-line surrounding the reprocessing area. Samples will be continuously collected and changed weekly unless airborne dust levels require more frequent sample changes.

The air effluent samples collected weekly will be composited and analyzed for gross alpha activity at a frequency of no less than one calendar quarter. Fansteel will perform an isotopic analysis on the composited air effluent samples semiannually for the first year of operation in order to confirm the conservative assumptions used to develop the administrative and action limits.

3.5.8 Environmental Sampling

Fansteel will perform environmental sampling at one location along the northernmost edge of the property boundary approximately 1,400 feet north of Chem C building. This location was selected as the best available monitoring point that is near an off-site occupied structure in the direction of the location of the maximally exposed individual as a result of plant operations. This sample will also be continuously collected and changed weekly unless airborne dust levels require more frequent sample changes.

3.5.9 Background Sampling

Fansteel will perform background sampling at one remote location on site. This location will be along the western property boundary near the main plant entrance. This sample will also be continuously collected and changed weekly unless airborne dust levels require more frequent sample changes.

3.5.10 Administrative Controls

If effluent concentration values measured at the perimeter air monitoring stations for gross alpha activity reach the administrative limit (50 percent of the effluent concentration limit, i.e., 2.85×10^{-14} µCi/ml), Fansteel will perform isotopic laboratory analysis on those samples for U-238, U-234, Th-232, and Th-228 to verify if the increased airborne radionuclide concentrations are due to plant operations. In addition, stack monitoring frequency will be increased to daily measurements and compared to the historical values obtained from the stack.

If the action limit of 4.3×10^{-14} μCi/ml (75 percent of the effluent concentration limit) is reached during perimeter air sampling analysis, the PRSO will suspend plant operations until the cause can be identified and corrective actions can be taken.

3.5.11 Product Sampling and Certification

The product streams being released to non-NRC licensed facilities will be processed to meet the release criterion of less than 0.05 percent (500 ppm or 500 μg/g) uranium and thorium combined as described in the definition of source material found in 10 CFR 40.4 and in Section 40.13 Unimportant quantities of source material. Daily grab samples will be composited on a weekly basis and then analyzed for total uranium and total thorium. If the limit of 0.05 percent is met or exceeded, the product will be reprocessed further in order to meet the release criterion before shipment to a non-NRC-licensed facility. All recipients of these products will receive certification that each shipment contains less than 0.05 percent uranium and thorium combined.

3.6 Storage

All products containing licensed material stored on site will be kept in a designated access-controlled area that is protected from the elements. If WIP removed from the ponds or other radioactive material is stored outside, it will be placed in a containment area. The containers will be covered with 6-mil polyvinylchloride seam-welded plastic and the area will be monitored visually on a daily basis until either consumed in the plant or disposed.

Spent filter media generated will be managed in accordance with all local, state, and federal requirements. Used resins will be washed and the wash will be further processed in the plant.

4.0 Plant Operations

Plant operations will be conducted in a manner to minimize radioactive material from entering the environment. New employees receive training in radiation and chemical safety which includes the demonstrations of proper use of safety equipment and lectures covering the importance of and proper procedures for radiation protection. Additionally, each employee is issued and required to read an Employee Handbook on radiation protection. The PRSO will maintain records of the training.

4.1 Operating Procedures

Plant operations shall be conducted in accordance with written SOP. These procedures contain instructions for proper operation of the equipment in each process area and include information pertaining to safety and hazardous chemicals handled in the area. SOP require review and approval by the RSC. SOP changes shall be approved in accordance with the plant process modification and implementation procedure. SOP shall be reviewed, revised, and approved by the RSC, then implemented in the plant.

Daily operation logs will be maintained by Fansteel. These logs will list process abnormalities and equipment malfunctions as well as corrective actions. In addition, as-built construction drawings have been provided to the NRC showing the final plant equipment layout that has been established.

4.2 Internal Audits and Inspections

Inspection of plant operations involves continuous observation by cognizant supervisory personnel on multiple daily visits through the facility to ascertain that operations are being conducted in accordance with standard procedures.

A primary responsibility of the PRSO is to review and audit plant operations for compliance with the license and NRC regulations. The PRSO has been delegated the authority to shut down operations or require additional safety precautions when such measures are deemed necessary.

The PRSO with assistance from the PSD and POM shall conduct a formal audit of plant operations to determine compliance with regulations, license conditions, and licensee procedures. All areas shall be audited at least annually. The findings of the audit, including deficiencies and the corrective actions taken, shall be documented in a formal report to the RSC.

4.3 Plant Chemical Safety Plan

Fansteel will comply with 29 CFR 1910.119, Process safety management of highly hazardous chemicals. Fansteel's Process Safety Manual and Hazardous Analysis Plan address potential impacts of chemical accidents on radiological operations. The plant shall comply with the specific elements of these documents. Fansteel will provide training regarding receiving, handling, distribution, and processing of chemicals utilized in plant operations.

4.4 Changes in Procedures, Facilities, and Equipment

A proposed change to an existing procedure, process modification, equipment change, or addition of a new process is subjected to review and approval in accordance with the process described above. The primary purpose of this process is to assure proper review and approval of changes to equipment or processes that could be detrimental to employee health and safety, environmental quality, or the integrity of the equipment. The following members of the RSC will review and approve each proposed modification.

- SGM
- PRSO
- PSD
- POM (Process and Utilities/Mining)

Approved procedures must be signed by the RSC members prior to distribution and use. Records of approved changes are maintained for review by the PSD.

5.0 Decommissioning Plan

Until plant processing operations have ceased, Fansteel will maintain the license it currently holds and all subsequent revisions. The facility will then decommission in a manner that will protect the health and safety of the public and be in accordance with NRC requirements in effect at that time.

The Decommissioning Plan (DP) describes the sequence of steps that will be undertaken by Fansteel to remove radioactive contamination from buildings, facilities, areas of land and groundwater at, on, or beneath the Eastern Property area of the facility.

The current version of the DP is kept at the Muskogee facility and has been submitted to the NRC as required.

6.0 Safety Demonstration

All personnel qualifications and radiological safety procedures in effect at the Muskogee facility are discussed in the current version of the RSM.

Plant respiratory protection is not part of the RSM but has been submitted under separate cover in the past. Current respiratory protection practices are consistent with those practices contained in the Safety Plan, ISORE Vol. 1, previously submitted and currently in effect.

7.0 License History

The AEC granted Source Material License SMB-911 to Fansteel on January 27, 1967. Fansteel has been operating under this license, as amended, since that date. The following data cover the issuance of License SMB-911, the renewal thereof, and the amendments thereto:

Action	Document Date
License Issued	January 27,1967
License Renewed	January 27, 1970
License Amendment No. 1	March 17, 1971
License Amendment No. 2	February 18, 1976
License Amendment No. 3	September 23, 1976
License Amendment No. 4	July 12, 1978
License Amendment No. 5	October 22, 1979
License Amendment No. 6	January 11, 1980
License Amendment No. 7	July 29, 1981
License Amendment No. 8	August 15, 1983
License Amendment No. 9	June 27, 1986
License Renewal Application	June 27, 1986
License Amendment No. 10	October 16, 1987
License Amendment No. 11	February 28, 1989
License Amendment No. 12	June 22, 1989
License Amendment No. 13	September 12, 1989
License Amendment Revised	February 1, 1990
License Amendment	December 1992
License Renewal Application	June 20, 1994
License Amendment	November 28, 1994
License Amendment Request	January 25, 1995
License Amendment Request	October 25, 1995
License Amendment	March 25, 1997
License Amendment Request	July 30, 1997
License Renewal	September 30, 1997
License Amendment No. 1	December 18, 1997
License Amendment Request	September 24, 1998
License Amendment Request	December 22, 1998
License Amendment Request	February 2, 1999
License Amendment Request	February 3, 1999
License Amendment Request	February 5, 1999
License Amendment No. 2	February 12, 1999
License Amendment Request	February 19, 1999
License Amendment No. 3	February 24, 1999
License Amendment No. 4	March 15, 1999
License Amendment Request	May 10, 1999
License Amendment Request	May 17, 1999
License Amendment No. 5	May 20, 1999
License Amendment Request	June 16, 1999
License Amendment Request	July 7, 1999

License Amendment Request	July 16, 1999
License Amendment No. 6	August 20, 1999
License Amendment No. 7	September 2, 1999

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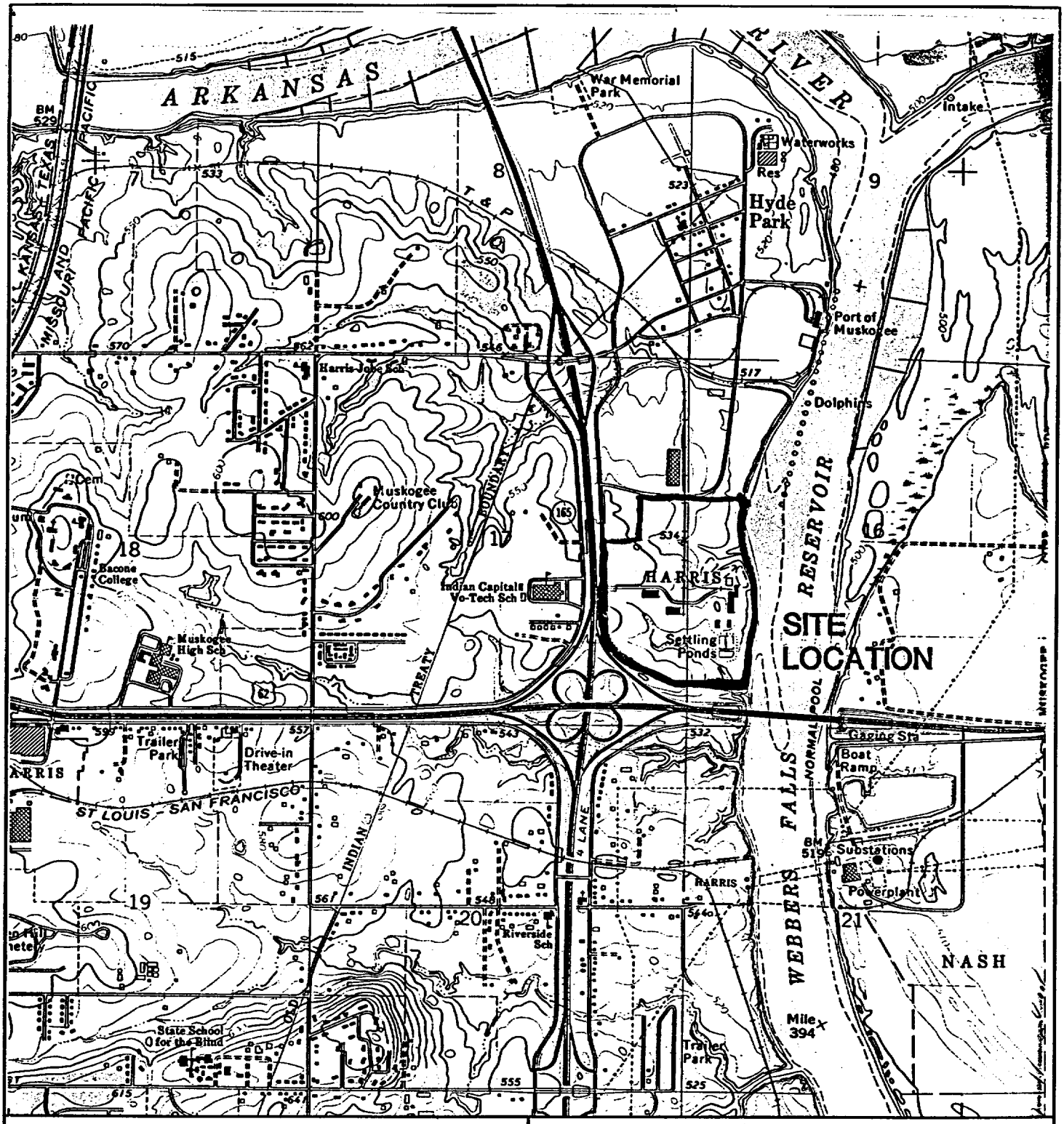

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FIGURE 1
SITE LOCATION MAP

FANSTEEL, INC.
MUSKOGEE, OKLAHOMA

PREPARED FOR
FANSTEEL, INC.
MUSKOGEE, OKLAHOMA

APPROVED	GEW 9/24/98
CHECKED	NH 9/24/98
DRAWN	BSP 9/23/98
DRAWING NUMBER	3789T001

Earth Sciences Consultants, Inc.
An Avalon Holdings Company

REFERENCE
USGS 7.5–MIN TOPOGRAPHIC QUADRANGLE
NORTHEAST MUSKOGEE, OKLAHOMA
DATED 1974
SCALE 1:24000.

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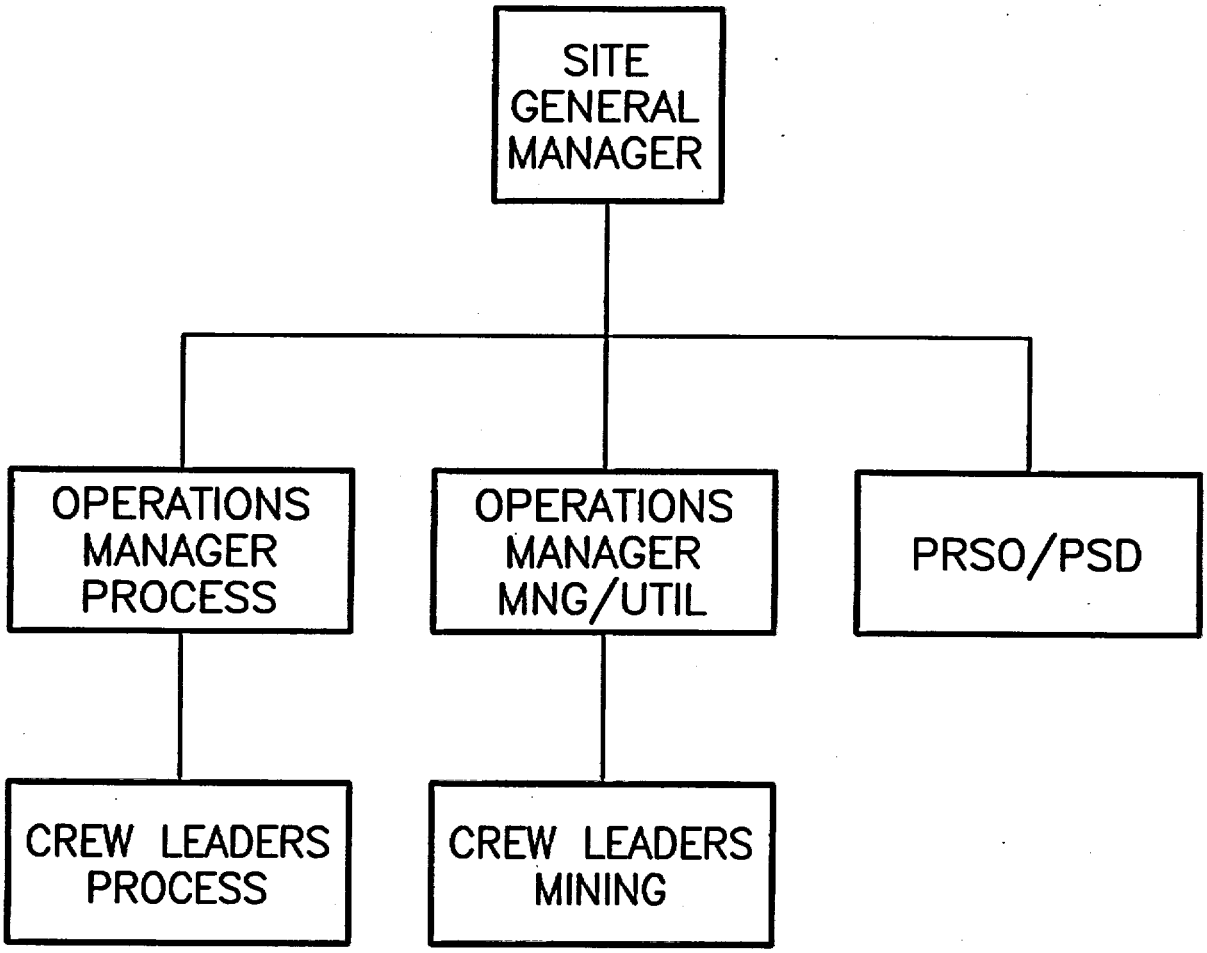

FIGURE 3

RADIATION SAFETY COMMITTEE ORGANIZATION

PREPARED FOR
FANSTEEL INC.
MUSKOGEE, OKLAHOMA

APPROVED	1/25/00
CHECKED	
DRAWN	GJA 06/24/99
DRAWING NUMBER	3789023

Earth Sciences Consultants, Inc.